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easily arranged for when they are to be made at a distance from the source of material. Sometimes a single sowing of teleutospores determines the point in question, but for a variety of reasons it usually does not. A common source of difficulty is the failure of the teleutospores to germinate. But these are details pertaining to a separate matter. It will be many years before any large proportion of our numerous heteroecious rusts will be connected with their respective aecidia, and in the meantime all clues to relationship will be much prized by students, and their pursuit will give to the collector an additional source of pleasure.—J. C. ARTHUR, *Purdue University.*

ROCKY MOUNTAIN PLANT STUDIES. I.

HAVING spent the past two collecting seasons in the field with Professor Nelson, and having had the opportunity of much observation and some investigation in the herbarium, I have become greatly interested in the varied and beautiful flora of the middle West. No one who comes into close contact with the plants of this region can fail to wish to know more of them. It is my belief that the following plants of this region have so far remained unrecognized. The types are all deposited in the Rocky mountain herbarium of the University of Wyoming.

Marsilia oligospora, n. sp.— Plant 4–7^{cm} high: leaflets woolly or becoming glabrous, 6–10^{mm} long, 3–7^{mm} wide: sporocarp solitary, 4–6^{mm} long, 4–5^{mm} wide, covered with long straight and appressed (rarely somewhat woolly) pubescence: raphe short: lower tooth short and blunt, upper a mere rounded papilla or wanting: peduncle 5–8^{mm} long: sori 5–8 in each valve: megaspores oval to barely oblong, 6–9 in each sorus.

This is a species which has passed for *M. vestita,* but seemingly bears no very close relationship to it. The absence of the sharp upper tooth on the sporocarp, which is so prominent in *M. vestita,* is a mark by which they may readily be distinguished in the field. The number of sori in each valve is less in *M. oligospora* than in *M. vestita*—5 to 8 in former, often 10 or 11 in the latter. The number of megaspores in the two is noticeably different, each sorus in *M. vestita* containing at least 12 and usually 18 to 20. There is also quite a noticeable difference in the shape of the megaspores and in the character of the pubescence of the sporocarp.

The type is number 6560 by *Aven Nelson* and *Elias Nelson,* from Jackson's hole, Uinta co., Wyoming. It occurred in the bed of a drying-up marshy lake.

Erythronium obtusatum, n. sp.—Bulb rather thick, 3–5^{cm} long, deeply imbedded in the soil: leaves oblong-elliptical, 10–20^{cm} long, 3–5^{cm} wide, obtuse but usually apiculate, never mottled: scape stout, usually 2–3-flowered (1–5): perianth segments pale yellow, drying with a purple tinge (in the field drying white), 2.5–3.5^{cm} long, 6–15^{mm} wide, usually reflexed: filaments dilated at the base and tapering gradually to a point at the anther; anthers 5–8^{mm} long, dark purple: stigma deeply 3-lobed; style very slender, usually equaling or exceeding the stamens.

This species is most closely related to *E. grandiflorum*, from which it differs in its very broad, obtuse leaves, its pale yellow and purple-tinged (at least when dry) flowers, its shorter, dark-purple anthers, and its dilated filaments. It probably has also been referred to *E. Hendersoni*, but this is out of the question since that calls for mottled leaves, purple perianth segments, fleshy subacute auricles at the base of the inner perianth segments, the two scales subglobose-inflated, very slender attenuate filaments, and a shortly 3-lobed stigma (ours deeply 3-lobed), none of which characters *E. obtusatum* possesses. It is barely possible that, in large part, the Erythroniums of Montana, as well as those of northern Wyoming and adjacent Idaho, are to be included in this species.

Two collections of it are at hand: Yellowstone park, Glen creek, 1889, *Aven Nelson* and *Elias Nelson*, no. 5606 (type); Idaho, Continental divide. 1899, same collectors, no. 5480 (co-type).

Erythronium parviflorum (Wats.).—A low plant with opposite leaves: bulb slender, 3–5^{cm} long: scape slender, 10–20^{cm} long: leaves oblong, tapering gradually to acuteness at both ends, 10–15^{cm} long, 3–4^{cm} wide: flowers rarely more than one, the peduncles abruptly curved in the form of a shepherd's crook: perianth segments broadly lanceolate-acuminate, 2–3^{cm} long, about 1^{cm} wide, bright yellow with a very pale greenish base, strongly reflexed: filaments slender, 1–1.5^{cm} long; anthers short, a little lighter than the petals: style clavate: ovary and capsule broadly oblong to even oval, 2–3^{cm} long.

This species differs from *E. grandiflorum* principally in being much smaller, in its smaller bright yellow flowers with light colored centers, its abruptly curved peduncles, and its very short anthers. The description of *E. grandiflorum parviflorum* Wats. is very indefinite and incomplete, but undoubtly refers to the above form, which is well worthy of specific rank.

Wyoming, Telephone mines, 1900, Aven Nelson, no. 7833; Colorado, summit of mountains, west of North park, 1899, *G. E. Osterhout.*

Tradescantia Laramiensis, n. sp.—Stems 3–4^{dm} long, branching freely; stems and branches erect, stout, glabrous; the branches arising from the axils of the leaves: persistent radical leaves few, linear, 5–10^{mm} wide; cauline leaves linear, forming a short turgid sheath at the base, a little narrower than the radical leaves; both radical and cauline strongly divaricate (nearly at right angles to the stem); the involucral leaves narrow (2–3^{mm} wide), often equaling the cauline: umbels sessile, terminating stems and branches: flowers very numerous in each umbel (often 50), hanging down in age: pedicels long (2.5–3.5^{cm}): pedicels and sepals remarkably glandular-pubescent: sepals linear-oblong, acute, 10–12^{mm} long: petals dark blue, broad, obtuse, about double the length of the sepals: filament once or twice sharply folded on itself and immersed in the copious wool arising from its lowest segment: ovary ribbed with rows of glandular hairs.

T. Laramiensis is related to *T. scopulorum*, but differs from it in the color of the flowers (*T. Laramiensis* being much darker), in stoutness, in the size and the arrangement of the umbels, in glandulosity of the inflorescence and flower, and in fruit characters. The remarkable pubescence is alone enough to separate *T. Laramiensis* from *T. scopulorum*, but the woolly condition of the filaments and enormous umbels are also decisive characters.

Collected in moist, rocky ground in Halleck cañon, Albany co., Wyoming, by *Aven Nelson*, no. 7455.

Iris pelogonus, n. sp.— Roots thick and fleshy: rootstock stout: stem simple, terete, stout, 2.5–3.5^{cm} long, 1–2-flowered: leaves mostly basal, very dull light green, thick and rigid, half as long to a little longer than the scape, 3–6^{mm} wide: flowers in bud dark blue, fading in age, pediceled; pedicel 1–10^{mm} long: perianth segments prominently nerved, glabrous, not crested, simple, outer ones 4–6^{cm} long, about 2^{cm} wide; the inner a little shorter and about 8^{mm} wide: tube above ovary 8–12^{mm} long: stigmas 12–18^{mm} long, exceeding the filaments by 5 or 6^{mm}: bracts scarious, lanceolate-acuminate, always completely concealing the ovary and usually extending half the length of the perianth segments.

This is a peculiar plant found in the Wasatch Tertiary clays. Its nearest relative is *I. Missouriensis* from which it differs in size, being much smaller, in the marked difference in color, width, and rigidity of the leaves, stoutness of the whole plant, being much stouter in proportion to its size, in the comparative length of the bracts with the pedicel, ovary, and flower, and in the relative length of the stigmas and filaments.

Collected at the Bush ranch, Sweetwater co., Wyoming, by *Aven Nelson*, no. 7102.

Alsine validus, n. sp.—Plant glabrous, much branched: stems four-angled, 12–18^{cm} high: leaves lanceolate, broadest at base, 1–3^{cm} long, thick, subcoriaceous, acute, rather rigid, never ciliated at base: bracts very small, 1–3^{mm} long, ovoid or oblong, somewhat acute, scarious: flowers in a usually terminal, many-flowered, compound cyme; pedicels and rays subequal, very variable, 2–5^{cm} long; pedicels straight and rigid, spreading or horizontal: petals deeply two cleft, a little exceeding the sepals: sepals ovoid, with somewhat acute point and scarious margins, 2–3^{mm} long, 1.5–2^{mm} wide: capsule dark brown, shining, nearly twice the length of the sepals, oval, obtuse: styles 3, 3–4^{mm} long, recurved and crested with an abundance of very fine short bristles: seed quite smooth.

The many-flowered compound cyme, stout, thick, wide-spreading pedicels, obtuse capsule, and very small bracts readily separate *A. validus* from *A. longipes*, its nearest relative. The latter has a simple few-flowered cyme, filiform, erect pedicels, more or less acute and more elongated capsule, and also much larger bracts. The character of the inflorescence of *A. validus* is much like that of *A. longifolia*, except that the pedicels are straight and stout instead of filiform and curved.

It was collected in the Centennial valley, Albany co., Wyoming, by *Aven Nelson*, and is the only material of it at hand. The type no. is 7726.—LESLIE N. GOODDING, *University of Wyoming, Laramie.*